

What is claimed is:

- 1           1. An isolated DNA molecule comprising a DNA  
2     sequence encoding a polypeptide with a first amino acid  
3     sequence selected from the group consisting of the amino  
4     acid sequences of the polypeptides MTBN1, MTBN2, MTBN3,  
5     MTBN4, MTBN5, MTBN6, MTBN7, and MTBN8, as depicted in  
6     Fig. 1,  
7           or a second amino acid sequence identical to said  
8     first amino acid sequence with conservative  
9     substitutions,  
10           wherein said polypeptide has *Mycobacterium*  
11     *tuberculosis* specific antigenic and immunogenic  
12     properties.
- 1           2. An isolated portion of the DNA molecule of  
2     claim 1, said portion encoding a segment of said  
3     polypeptide shorter than the full-length polypeptide,  
4     said segment having *Mycobacterium tuberculosis* specific  
5     antigenic and immunogenic properties.
- 1           3. A vector comprising:  
2           (a) the DNA molecule of claim 1; and  
3           (b) transcriptional and translational regulatory  
4     sequences operationally linked to said DNA sequence, said  
5     regulatory sequences allowing for expression of the  
6     polypeptide encoded by said DNA sequence in a cell.
- 1           4. A vector comprising:  
2           (a) the DNA molecule of claim 2; and  
3           (b) transcriptional and translational regulatory  
4     sequences operationally linked to said DNA sequence, said  
5     regulatory sequences allowing for expression of the  
6     polypeptide encoded by said DNA sequence in a cell.
- 1           5. A cell transformed with the vector of claim 3.
- 1           6. A cell transformed with the vector of claim 4.

2           7. A composition comprising the vector of claim 3  
3 and a pharmaceutically acceptable diluent or filler.

1           8. A composition comprising the vector of claim 4  
2 and a pharmaceutically acceptable diluent or filler.

1           9. A composition comprising at least two DNA  
2 sequences, each encoding a polypeptide of the  
3 *Mycobacterium tuberculosis* complex that is not a  
4 polypeptide encoded by the genome of cells of the Bacille  
5 Calmette Guerin (BCG) strain of *Mycobacteria bovis*, said  
6 DNA sequences being operationally linked to  
7 transcriptional and translational regulatory sequences  
8 which allow for expression of each said polypeptide in a  
9 cell of a vertebrate,  
10           wherein at least one of said DNA sequences is a  
11 DNA molecule of claim 1.

1           10. A composition comprising at least two DNA  
2 sequences, each encoding a functional fragment of a  
3 polypeptide of the *Mycobacterium tuberculosis* complex,  
4 said DNA sequences being operationally linked to  
5 transcriptional and translational regulatory sequences  
6 which allow for expression of each said polypeptide in a  
7 cell of a vertebrate,  
8           wherein at least one of said DNA sequences is a  
9 DNA molecule of claim 2.

1           11. An isolated polypeptide with a first amino  
2 acid sequence selected from the group consisting of the  
3 sequences of the polypeptides MTBN1, MTBN2, MTBN3, MTBN4,  
4 MTBN5, MTBN6, MTBN7, and MTBN8, as depicted in Fig. 1,  
5           or a second amino acid sequence identical to said  
6 first amino acid sequence with conservative  
7 substitutions,  
8           wherein said polypeptide has *Mycobacterium*  
9 *tuberculosis* specific antigenic and immunogenic  
10 properties.

1           12. An isolated segment of the polypeptide of  
2 claim 11, said segment being shorter than the full-length  
3 polypeptide and having *Mycobacterium tuberculosis*  
4 specific antigenic and immunogenic properties.

1           13. A composition comprising the polypeptide of  
2 claim 11 and a pharmaceutically acceptable diluent or  
3 filler.

1           14. A composition comprising a functional  
2 fragment of the polypeptide of claim 12 and a  
3 pharmaceutically acceptable diluent or filler.

1           15. A composition comprising at least two  
2 polypeptides of the *Mycobacterium tuberculosis* complex,  
3 each polypeptide not being encoded by the genome of the  
4 cells of the BCG strain of *Mycobacterium bovis*, wherein  
5 at least one of said polypeptides is a polypeptide of  
6 claim 1.

1           16. A composition comprising functional fragments  
2 of at least two polypeptides of the *Mycobacterium*  
3 *tuberculosis* complex, each polypeptide not being encoded  
4 by the genome of cells of the Bacille Calmette Guerin  
5 (BCG) strain of *Mycobacteria bovis*, wherein at least one  
6 of said polypeptides is a segment of claim 2.

1           17. A method of diagnosis comprising:  
2           (a) administration of the composition of claim 15  
3 to a subject suspected of having or being susceptible to  
4 *Mycobacterium tuberculosis* infection; and  
5           (b) detecting an immune response in said subject  
6 to said composition as an indication that said subject  
7 has or is susceptible to *Mycobacterium tuberculosis*  
8 infection.

1 18. A method of diagnosis comprising:

2 (a) administration of the composition of claim 16  
3 to a subject suspected of having or being susceptible to  
4 *Mycobacterium tuberculosis* infection; and

5 (b) detecting an immune response in said subject  
6 to said composition as an indication that said subject  
7 has or is susceptible to *Mycobacterium tuberculosis*  
8 infection.

1 19. A method of diagnosis comprising:

2 (a) providing a population of cells comprising CD4  
3 T lymphocytes from a subject;

4 (b) providing a population of cells comprising  
5 antigen presenting cells (APC) expressing a major  
6 histocompatibility complex (MHC) class II molecule  
7 expressed by said subject;

8 (c) contacting the CD4 lymphocytes of (a) with the  
9 APC of (b) in the presence of the polypeptide of claim  
10 12; and

11 (d) determining the ability of said CD4  
12 lymphocytes to respond to said polypeptide, as an  
13 indication that said subject has or is susceptible to  
14 *Mycobacterium tuberculosis* infection.

1 20. A method of diagnosis comprising:

2 (a) providing a population of cells comprising CD4  
3 T lymphocytes from a subject;

4 (b) providing a population of cells comprising  
5 antigen presenting cells (APC) expressing at least one  
6 major histocompatibility complex (MHC) class II molecule  
7 expressed by said subject;

8 (c) contacting the CD4 lymphocytes of (a) with the  
9 APC of (b) in the presence of the segment of claim 12;  
10 and

11 (d) determining the ability of said CD4  
12 lymphocytes to respond to said polypeptide, as an

13 indication that said subject has or is susceptible to  
14 *Mycobacterium tuberculosis* infection.

1 21. A method of diagnosis comprising:

2 (a) providing a population of cells comprising CD4  
3 T lymphocytes from a subject;

4 (b) providing a population of cells comprising  
5 antigen presenting cells (APC) expressing at least one  
6 major histocompatibility complex (MHC) class II molecule  
7 expressed by said subject;

8 (c) contacting the CD4 lymphocytes of (a) with the  
9 APC of (b) in the presence of the composition of claim  
10 15; and

11 (d) determining the ability of said CD4  
12 lymphocytes to respond to said polypeptide, as an  
13 indication that said subject has or is susceptible to  
14 *Mycobacterium tuberculosis* infection.

1 22. A method of diagnosis comprising:

2 (a) providing a population of cells comprising CD4  
3 T lymphocytes from a subject;

4 (b) providing a population of cells comprising  
5 antigen presenting cells (APC) expressing at least one  
6 major histocompatibility complex (MHC) class II molecule  
7 expressed by said subject;

8 (c) contacting the CD4 lymphocytes of (a) with the  
9 APC of (b) in the presence of the composition of claim  
10 16; and

11 (d) determining the ability of said CD4  
12 lymphocytes to respond to said polypeptide, as an  
13 indication that said subject has or is susceptible to  
14 *Mycobacterium tuberculosis* infection.

1 23. A method of diagnosis comprising:

2 (a) contacting the polypeptide of claim 11 with a  
3 bodily fluid of a subject;

4 (b) detecting the presence of binding of antibody  
5 to said polypeptide, as an indication that said subject  
6 has or is susceptible to *Mycobacterium tuberculosis*  
7 infection.

1 24. A method of diagnosis comprising:

2 (a) contacting the segment of claim 12 with a  
3 bodily fluid of a subject;

4 (b) detecting the presence of binding of antibody  
5 to said polypeptide, as an indication that said subject  
6 has or is susceptible to *Mycobacterium tuberculosis*  
7 infection.

1 25. A method of diagnosis comprising:

2 (a) contacting the composition of claim 15 with a  
3 bodily fluid of a subject;

4 (b) detecting the presence of binding of antibody  
5 to said composition, as an indication that said subject  
6 has or is susceptible to *Mycobacterium tuberculosis*  
7 infection.

1 26. A method of diagnosis comprising:

2 (a) contacting the composition of claim 16 with a  
3 bodily fluid of a subject;

4 (b) detecting the presence of binding of antibody  
5 to said composition, as an indication that said subject  
6 has or is susceptible to *Mycobacterium tuberculosis*  
7 infection.

1 27. A method of vaccination comprising  
2 administration of the composition of claim 7 to a  
3 subject.

1 28. A method of vaccination comprising  
2 administration of the composition of claim 8 to a  
3 subject.

1           29. A method of vaccination comprising  
2 administration of the composition of claim 9 to a  
3 subject.

1           30. A method of vaccination comprising  
2 administration of the composition of claim 10 to a  
3 subject.

1           31. A method of vaccination comprising  
2 administration of the composition of claim 13 to a  
3 subject.

1           32. A method of vaccination comprising  
2 administration of the composition of claim 14 to a  
3 subject.

1           33. A method of vaccination comprising  
2 administration of the composition of claim 15 to a  
3 subject.

1           34. A method of vaccination comprising  
2 administration of the composition of claim 16 to a  
3 subject.